

# THE MADRAS AGRICULTURAL JOURNAL

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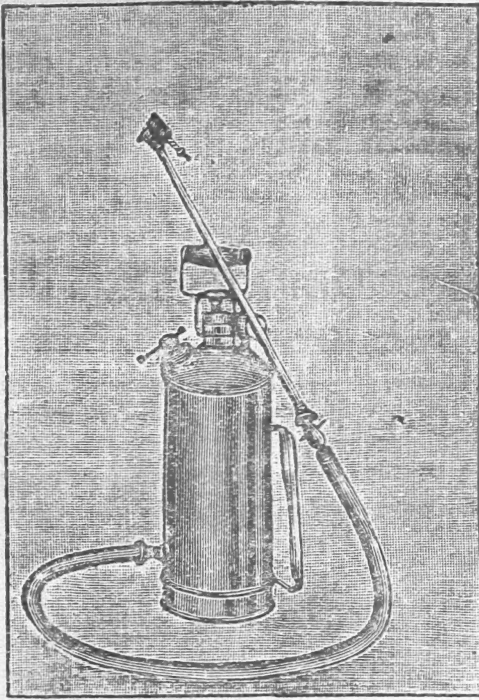
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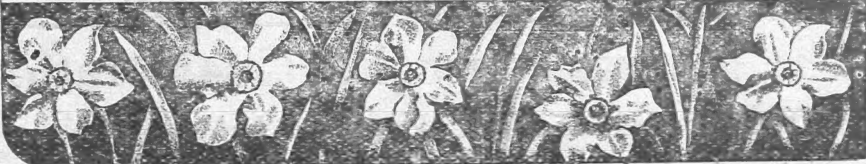


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## Mr. ALLAN CARRUTH

We are sorry to report about the death of Mr. Allan Carruth, a former member of the Madras Agricultural Department and one of the patrons and wellwishers of the Madras Agricultural Students' Union.

2. Mr. Allan Carruth was the second son of Mr. William Carruth of Lawnmarnock, Renfrewshire, Scotland. He took his college course at the West of Scotland Agricultural College, Glasgow. In 1907 he became an instructor and lecturer in Agriculture under the Department of Agriculture and Technical Instruction for Ireland which he resigned in 1913 to take up the post of Country Organiser under the Edinburgh and East of Scotland College of Agriculture.

3. He joined the Department of Agriculture, Madras in April 1916 as the Deputy Director of Live-Stock and resigned it in November 1919. He was later on employed under the Board of Agriculture for Scotland as a Divisional Land Officer and was at the time of his death in charge of Land Settlement in the Eastern area of Scotland. During last August he went on a holiday trip to U. S. S. R. with the object of gaining information regarding the system of land tenure and small holdings in that country. He was suddenly taken ill and died of colitis at Odessa on 4th August.

4. Mr. Carruth was unmarried and 60 years of age at the time of his death.

5. During the short period of service in Madras, he was responsible for the starting of a Cattle Farm at Chintaladevi for the improvement of the Ongole Breed and for the selection and importation of Ayrshire bulls for the purpose of improving, by cross breeding, the Dairy Trade of Madras of which he had made a special study. The report of his enquiry was later on issued as a Bulletin of the Department. He was an excellent man among stock, as his movements were deliberate. In working out his plans he was very cautious and liked to be sure of his facts before he decided on the course of action, but having once made up his mind he stuck to the line he had laid out. We are sure that if only he had stayed long enough in the Department he would have left a mark.

6. Although his stay with us was much too short, his interest in South Indian Agriculture was immense. He was a generous patron of the Madras Agricultural Students' Union and took great interest in its progress and activities even after his departure from Madras. He never missed to send at every College Day a message of encouragement and good wishes, together with a very liberal donation.





ALLAN CARRUTH  
(Patron of the Madras Agricultural Students' Union)  
*Formerly Deputy Director, Live-stock, Madras.*

*(Life sketch on the reverse)*

# Madras Agricultural Journal

(ORGAN OF THE M. A. S. UNION)

Vol. XXV ]

JANUARY 1937

[ No. 1.

## Editorial.

**1937.** We wish all our readers and every member of the Madras Agricultural Students' Union a very happy and prosperous 'New Year'.

**Ourselves.** The Madras Agricultural Journal enters on its twentyfifth year of existence, with this edition. And even at the risk of being accused of self-conceit we would like to express our pleasure and pride at the fact that it has been possible for this journal to render its readers an uninterrupted service of a quarter of a century, an achievement which in itself any journal could be proud of and that due solely to the selfless work of a band of honorary workers who could ill spare the necessary leisure from their legitimate official duties. To our old customers we would repeat our old pledge "to continue to serve them as well in the future as in the past" and as regards our prospective patrons we will only say, again in the words of the old tradesman, "try us once and you will never leave us."

**The New King.** It is just a year since we announced in these columns the sad news of the death of King George V of revered memory. Before the year closed there has been another change in the person of the British Monarch. This news is, by now, well known to all our readers and we don't therefore propose to give any details of the unhappy affair. "The whole thing was a nine days' wonder." In whatever light the whole affair is viewed nobody can deny that the ex-king Edward VIII made his exit in a manner worthy of a great and courageous ruler. We wish the Duke of Windsor, as he is now known, long life, peace of mind and above all the happiness in search of which he relinquished the throne of the great empire over which the Sun never sets.

In his successor King George VI we have a prototype of the father. We join in the respectful and loyal felicitations accorded to him and his consort Queen Elizabeth and wish them a long and prosperous reign in the years to come.

**The New Constitution.** In less than two months from today thirty million inhabitants of this great country will be called upon to exercise their right of electing representatives to the various legislative bodies in accordance with the provisions of the reformed constitution. Politics is not in our line, but the occasion is unique in many ways and our readers will bear with us if we propose to touch on a matter which will engage the attention of these legislatures perhaps not long after their inauguration. We refer to the question of the

"Security of the Services" in which every member of the M. A. S. U. or at least a large majority of them will be interested. The leaders of some of the better organised political organisations in this country appear to be under the impression, as evidenced from their utterances that the only sure and speedy cure for all the ills which the Indian ryot is suffering from is the drastic reduction of the salaries of the existing civil service. We do not for a moment deny that there is considerable disparity in the scales of pay drawn by officers in the different services, for which there is little or no justification and that reduction in the present scales is perhaps desirable at least in some of the services, especially in the higher grades. But as the President of the Indian Officers' Association ably put it recently "at the same time it is equally important that the conditions of service are not allowed to become the sport of parties". We would crave the indulgence of our readers to quote a few more sentences from the above speech which are relevant to the point at issue. He continues "they (the services) have a long history behind.....Freakish proposals based on simple *apriori-formulae* unrelated to any principles..... will do the greatest possible damage. Nothing undermines the contentment and efficiency of a permanent civil service as a feeling of insecurity or uncertainty as to pay, prospects and pension. We will conclude by subscribing to the hope expressed by H. E. Lord Erskine in reply to the above speech in the following words. "I think the future ministers will have far too great a sense of what will be in their own interest to damage an efficient and loyal service".

There are other matters connected with the new constitution as important as the one referred to above and more directly connected with us as agriculturists. These, we will leave for consideration in some of the later issues.

**The Indian Science Congress.** As we write, the congress is meeting in the capital of His Exalted Highness the Nizam of Hyderabad and Berar. This year's deliberations are guided by Rao Bahadur T. S. Venkataraman, one of the oldest members of the M. A. S. U. and once editor of this journal. We wish the congress a very successful session under his able guidance.

**The World Situation.** The miserable state through which the world trade was struggling during the last few years is just showing slow but sure recovery to more favourable conditions. The prices of agricultural produce have started indicating an upward curve, at least in respect of some of the commodities which have a ready foreign market. But the same hopeful feature is not evident in the political atmosphere. In Europe and the Far East things are getting from bad to worse and as far as we know it would be nothing less than a miracle if the clouds pass off without throwing out the ominous spark, leading to a world conflagration, perhaps sooner than later. We sincerely wish however, that our fears may prove to be groundless.



# POSSIBILITIES OF TRACTOR PLOUGHING IN BELLARY AND ANANTAPUR DISTRICTS

BY K. SANJEEVA SHETTY, B. Sc., Ag.

The figures furnished by the Board of Revenue reveal that there is a large area under cultivable wastes other than fallow in this Presidency. Such areas are considerable in districts of low rainfall, where nature is partly responsible for these lands being not brought under proper cultivation. The area under cultivable waste in Bellary district is estimated to be 299000 acres and in Anantapur 633000 acres. Such large areas exist also in other districts of the Presidency.

It is estimated that to make the Presidency self-sufficient in the matter of food and other crops the additional acreage required to produce the present deficit is as follows :—

Rice.....	560000	acres,
Wheat.....	37000	„
Linseed.....	4400	„
Gingelly.....	113500	„
Pulses.....	48000	„
Betel nuts.....	14000	„
Sugarcane.....	36000	„

The question whether the existing cultivable waste can be reclaimed and utilised for the growing of crops in which there is a deficit in the Presidency may be examined.

The scope of this little note is to suggest among other things whether the introduction of mechanical power would not create an entirely different situation by affording facilities for the conversion of a fair percentage of the total area under cultivable waste into arable fields.

The deficit in the acreage of dry crops like wheat, linseed, gingelly, and pulses in this Presidency is about 202900 acres and it is possible to make up this deficiency to some extent in the dry tracts themselves. In Bellary and Anantapur districts alone we have a total area of about 932000 acres of cultivable waste. It is true that a major portion of this cultivable waste lies not only in very barren portions of the districts but is so situated as not to permit of any cultivation. At any rate if on a modest estimate we are able to bring under cultivation at least 2 to 5 percent of the total area it should give us about 20000 to 50000 acres for the cultivation of dry crops in Bellary and Anantapur districts alone.

**The Present Agricultural Condition of the Tract.** Yet there is another aspect of the question. Statistics and figures often give a wrong impression of the actual situation. A study of the local agricultural conditions would show that even large areas under cultivation are left fallow from year to year owing to various causes

such as successive seasonal failures, low price of agricultural commodity and want of sufficient number of cattle to cope up with the large area. How then would it be possible to bring cultivable wastes under the plough?

**Agricultural Practices of the Tract.** In these two districts we have two distinct soil types—the red and the black overlying a substratum of kankar or nodular limestone. The soils are of varying depths ranging from 1 to 4 or 5 ft. of surface soil—generally 1'—2' not usually above 2' except where it is transported. The red soils (mungari area) are ploughed every year with country wooden ploughs whereas the usual operation on black soils is harrowing with the guntaka. Black soils are generally ploughed deep once in 5 or 6 years with heavy iron ploughs drawn by 4 to 6 pairs of animals. A ryot in these parts usually owns a pair of bullocks for an area of about 40 acres. A black soil ryot owning 40 acres of land and one pair of cattle has to give deep ploughing to an area of 8 acres every year to complete the operation for all the 40 acres in a period of 5 years. Five pairs of animals are able to finish half an acre of deep ploughing per day and 80 pairs of bullocks are therefore required to finish the deep ploughing operation every year for a block of 8 acres or alternatively a pair of cattle has continuous work for 80 days or about 3 months in summer to finish the ploughing operation alone. Besides this operation, preliminary cultivation for the other 30 acres has to continue, thrashing of cereal crops and transporting of cotton and other agricultural commodities to the market etc, have to be attended to. The above state of affairs indicates that with the existing condition and number of cattle, it is not possible to give the optimum tillage to the lands and cultivation is in consequence spasmodic.

**The Solution of the Problem.** What can be done then to set matters right? The simple question arises whether an increase in the number of cattle maintained would not solve the problem. Can the ryot not have a pair of animals for a holding of 20 acres instead of 40 acres as at present? The answer is, no; it has been found that fodder scarcity is the greatest difficulty owing to successive crop failures. It is held therefore, that so long as these tracts are not free from the frequent visitations of famine, the fodder problem is bound to limit the increase of the cattle population. The only other alternative to meet the situation of improving the cultivation seems to be to introduce mechanised ploughing.

**Possibilities of Tractor Ploughing.** In the year 1935 the Carnatic Agricultural transporting company of Hubli demonstrated the working of their tractors in Bellary for the first time. The successful demonstrations of these tractors attracted the attention of several land owners in Bellary taluk and about 600 acres of black cotton soil were ploughed that year. The rate charged were Rs. 15/—per acre

for 15" depth of ploughing and Rs. 8—10 per acre of 8 to 10" ploughing. Shallow seasonal ploughing (6—8") was also done at a cost of Rs. 4/—per acre. Deep ploughing was done in lands badly infested with Hariali (*Cynodon dactylon*) it was observed that the stand of the crop in the tractor ploughed lands and outturn thereof were distinctly better than in the previous years.

Deep ploughing is essentially done to eradicate Hariali and the work turned out by the tractor at a cost of Rs. 15 per acre was decidedly better than what it would be if Hariali was dug by human labour which usually costs Rs. 25 per acre. Thus there is a saving of Rs. 10 per acre in the cost of cultivation apart from the *Quid pro quo* of increased yield.

Tractor ploughing appears to be an ideal operation for Hariali ridden lands of which there is a considerable area in these districts; and the cost of this operation when compared with the cost of doing it with human labour (ordinary heavy iron ploughs are not able to work in a field over grown with Hariali) is about 40% cheaper with better results.

It has to be admitted, however, that the cost of tractor ploughing of Rs. 15 per acre is pretty high in spite of its comparative cheapness, but this rate is likely to be reduced when these operations are more regularised and made popular, and fairly large areas are ploughed every year. The demonstration of tractor ploughing has kindled the enthusiasm of some wealthy land owners of Bellary district. In 1936 more area was ploughed and attempts are now being made by a few to purchase one or two tractors for use in the district.

There is a great future for the introduction of tractor ploughing in these districts, of course, within certain limitations. Not only the cultivator feels that the lands which are now receiving insufficient tillage would be brought under better cultivation, but there is every likelihood of a large area at present lying waste being brought under cultivation.

**Conditions Favourable for Tractor Ploughing.** The tractor ploughing requires a fairly large area probably not less than 50 to 100 acre blocks lying fairly close, to enable easy transport of the machinery. The ploughing should commence early in the season, January to February and finish by the 15th of May to facilitate the weathering of soil and the destruction of Hariali and its roots in the hot weather.

**How to Popularise the Introduction of Mechanised Ploughing.** It may be argued that in these days of depression when the ryot is not able to carry on with his ordinary agricultural operations it may not be possible for him to meet the cost of tractor ploughing. It is reported that in the Bombay presidency ploughings are done with the aid of Thakkavi loans granted by the state. The company that executes the work receives payment at the rates fixed from the Government.

on behalf of the ryot. This amount is treated as a loan to the ryot in accordance with the terms of the Thakkavi loan act. This system has considerably helped the ryots in Dharwar district where tractor ploughing has been popularised to such an extent that large areas are ploughed every year. It is urged therefore, that wherever sufficient security is forth-coming and where the land owner is not already over burdened with debts the system may be adopted in the Madras Presidency as well. In my enquiries in the villages of Bellary I could gather that there is a large number of ryots willing to get their lands ploughed with the tractor if only Government loans could be secured. Doubts may also be entertained as to the advisability of large scale mechanised ploughing which in the initial stage involves the ryot in additional expenditure in a tract where, under existing conditions of nature, and precarious seasonal factors successful raising of crops is problematical. Will not this innovation deprive a part of the agricultural labourers of their employment and thus aggravate the distress of the agrarian population ?

Such fears are unfounded because the labourer on being thrown out of employment from ploughing operations will be compensated by the large area under cultivation. Larger yields may also be expected as a result of better farming methods which necessarily would involve the employment of more labour for harvesting, thrashing, and preparation for the market etc.

## **GREEN FEED FOR POULTRY**

By H. NARAHARI RAO

The necessity of green food for poultry, specially for the growing chicken need not too greatly be emphasized. Under normal conditions, they are natural foragers and when released in the mornings they prefer young succulent grass and other edible weeds to artificial feeds. This kind of foraging tends to keep the birds in a healthy and active condition and as such this should be encouraged as far as possible.

Men with considerable experience in poultry insist on a liberal supply of green feed to the birds, as this tends not only to the egg-production, but also to keep the flock in a healthy condition.

One reason why the birds under free range system grow much quicker and healthier than those under confinement, is that the former get the requisite quantity of green material as their food. In a poultry yard where the birds have been kept in wire netting enclosures for some days, it will be noticed that the ground becomes bare and after some time the pasture becomes totally extinct, the reason being that the birds nip all the tender shoots ; so that there is no chance for the pasture to grow at all. Under the intensive and semi-intensive systems of poultry keeping, the birds do not get the required amount of green material, unless adequately supplemented.

By green feed is generally meant all kinds of greens from the stalk of some vegetables to the tender green grass. The best and the easily available are the several kinds of grasses. Tender green grass is said to be the best material for rapid growth and is equivalent to any concentrated food material. It supplies enough protein for flesh formation and contains vitamins and minerals besides providing the necessary bulk to the ration.

The green feeds supplied to poultry should be fresh and succulent and the most suitable among them are: green grass, leaves of cabbage, cauli-flower, lettuce, lucerne, berseem, pillipesara, amaranthus, drumstick, radish, country spinach, and carrots.

During the winter months, there is an abundance of green food available, but it becomes scarce as summer approaches.

At the Agricultural Research Station, Anakapalle, at the suggestion of the Superintendent of the farm, we have been regularly following a particular system which has worked quite satisfactorily.

Shallow nursery pots 6" to 9" deep with 2½' diameter are filled in with rich soil mixed with farm yard manure. The seeds of Ganti, Ragi, mixed with a small quantity of Pillipesara are sown thick in these pots and watered. The tender seedlings will be available for use after 8 to 10 days from the date of sowing. These pots are transferred to the chicken pens both in the morning and evening for an hour each time.

With a view to study the effect of this on the growth of chicken, 7 chicks from the Rhode Island Reds, 7 from the White Leg-Horns, 6 from the Light Sussex and 4 from the Black Minorca were selected from those that hatched on the same day (i. e.) on 21-4-1935.

Four Rhode Island Reds and 4 White Leghorns got the green sprouts and 3 were the controls in each. 3 Light Sussex and 2 Black Minorcas got the green sprouts whereas a similar number formed the controls in each. The chicken were weighed and their weights recorded from 21-4-1935 to 28-7-1935.

The statement herewith appended gives details.

Breed and Number.	Experimental.		Number.	Control.	
	21-4-'35 Grams.	28-7-'35 Grams.		21-4-'35 Grams.	28-7-'35 Grams.
Rhode Island Red. ... 1	42	1,059	5	44	994
" ... 2	43	1,116	6	43	804
" ... 3	37	1,178	7	46	892
" ... 4	39	died	—	—	—
White Leg Horns. ... 1	29	976	5	27	died
" ... 2	33	998	6	38	792
" ... 3	32	1,018	7	32	746
" ... 4	29	802	—	—	—
Light Sussex. ... 1	37	1,192	4	40	died
" ... 2	38	1,240	5	39	920
" ... 3	39	1,181	6	39	916
Black Minorca. ... 1	34	916	3	35	716
" ... 2	33	839	4	33	died.

From the above, it will be seen that the chicken that got the green sprouts grow much better than the controls.

It is generally presumed that chicken are not pasture feeders and are more often enclosed in a bare piece of land. The birds do suffer for want of suitable material for their proper growth. In the case of intensive poultry keeping, it is a good plan to give rest to the runs and to dig up the soil as often as necessary to encourage the growth of vegetation by sowing seeds.

## **"COMPARISONS BETWEEN THE SELFED AND NON-SELFED ONION FLOWER HEADS AND BETWEEN THE EARLY AND LATE FLOWER HEADS ARISING FROM THE SAME ONION BULB"**

BY C. VIJAYARAGHAVAN, L. Ag.,

*Superintendent, Dry Farming Station, Hagari*

and

N. KESAVA IYENGAR, M. A.

*Assistant in Cotton, Agricultural Research Station, Hagari*

For breeding pure lines in onion, the flower heads were selfed at the Agricultural Research Station Hagari, in the season 1934. In the selfed heads very poor setting was observed and the weight of the seed also was found to be much lower than that obtained from the non-selfed.

In this crop very frequently, two heads arise from a single bulb. The first head is put forth early in the season and when the capsules of this are fully formed, the second head is produced. The seeds collected from the later heads were found to be poorer in weight than those from the earlier ones.

With the object of testing whether selfing and lateness of flowering, affect also, certain other characters of the onion, the following data were gathered.

The observations were made on large sized Dhulia onion, acclimatised here for a long time. The crop was planted during the cold weather of 1934 under irrigated conditions. In Tables I and II, the statistical values of the characters studied are given.

From Table I it is clear that for all the characters observed the values of the non-selfed heads are higher. Table II shows that with the exception of "Percentage of capsules formed" all the values are higher in the case of early heads. The better setting observed in the case of lateheads may be due to sparser distribution of the flowers in the head. The few flowers that were produced had greater scope for complete development.

Selfing in onion was found to be injurious by other workers also. As early as 1888, Charles Darwin has remarked in his classical book, 'Cross and Self Fertilization of Plants in the Vegetable Kingdom' that in onion (Blood-red, Var.) the selfed heads showed a very poor setting. Jones and Emsweller recommended for onion breeding, isolation of pure lines by selfing and a free crossing of the plants of the same stock to regain their lost vigour.

### Summary.

1. "Selfing" is injurious to seed setting and other characters in onion.

2. In the case of bulbs producing two flushes of flowering it is desirable to collect seeds from the earlier heads.

### References.

1. Charles Darwin, 1888. Cross and Self Fertilization.
2. Jones, H. A., and Emsweller, S. L.—Methods of Breeding onions. Imperial Bulletin of Fruit Production Vol. No. 1. Page 31.

**Table I.**

*Comparison between 'Selfed' & Non-selfed flower heads of onion.*

No. of determinations.	Percentage of Capsules formed.		Wt. of 500 seeds in grammes.		No. of seeds per head.		Percentage of Germination.		Mean Wt. of bulbs in ounces.	
	S. F.	N. F.	S. F.	N. F.	S. F.	N. F.	S. F.	N. F.	S. F.	N. F.
	10	10	10	10	10	10	9	9	6	6
Mean.	51.3	71.2	1.64	2.13	158.8	1500.6	7.667	35.56	2.667	4.55
S. E. of mean difference.	1.5711		0.03155		46.327		1.3266		0.23026	

**Table II.**

*Comparison between the "Early" & "Late" flower heads arising from the same bulb in onion.*

No. of determinations.	No. of flowers in the head.		Percentage of Capsules formed.		Wt. of 500 seeds in grammes.		Percentage of germination.	
	E	L	E	L	E	L	E	L
	17	17	17	17	17	17	14	14
Mean.	453.8	175.8	74.0	78.6	2.212	1.648	55.07	26.714
S. E. of mean difference.	4.998		0.89913		0.20722		1.3244	



# CABBAGE GROWING ON THE NILGIRIS

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Among the "English Vegetables" which are eaten by Indians to a fairly large extent and which can be considered as "established vegetables", cabbage stands only next to potato in importance. Although it has not found a place in the "average village gardens" it is grown by market gardeners in the suburbs of many large towns in this country. The fact that cabbages are sold even in village shandies in recent times shows that the masses too are getting accustomed to the use of cabbage in their food.

Cabbage has been grown on the Nilgiris for over a century. Until a few years ago, it was grown, among other vegetables, in the market gardens in Ootacamud, Wellington, Coonoor and Kotagiri and their immediate surroundings, by small growers, more with the object of meeting the local demands than as a commercial crop. It was almost always grown with other vegetables in small patches of ground of even less than one cent in extent. These market gardens are small holdings and are cultivated intensively as most of the ryots engaged in market gardening are also interested in the supply of milk in towns. They have therefore plenty of cattle manure for the needs of the garden and as the fertility of the soil is thereby maintained, an intensive cultivation is possible.

During the past decade, the production of cabbage even in market gardens has been increasing owing to demands from outside the district. On shandy days baskets containing cabbage and other vegetables are being sent to individual consumers in Madras and other towns and cabbages are also sent by train to these towns packed in gunnies, for sale.

During the past five years despatches of cabbages by rail and lorry from Ootacamund and Mettupalayam to the more important towns of the Madras Presidency have been increasing and as a result of this increase, cabbages are, during the past two years in particular, grown on "field scale". Lorries loaded with cabbages go to Coimbatore, Calicut, Salem, Trichinopoly, and even Madras once a week or oftener according to demands.

The most important reason for the rapid increase in the area under cabbage in recent years has been the fall in prices of potatoes. The chief occupation of the ryots on the Nilgiris is potato cultivation. As it is not sufficiently paying and as unemployment is increasing ryots are resorting to growing cabbages in order to supplement their income. It has been found by experience that growing cabbages



immediately after harvesting a potato crop has been profitable because the expenses and trouble are much less than if they were to grow on other lands. The preparation of the land does not involve much labour and the fences erected for the potato field would serve the cabbage crop also. For the potato crop ryots are using large quantities of fertilisers, the residual effects of which are available for the cabbage crop which follows the potato crop. In some cases the application of the available quantity of farmyard manure might alone be sufficient to produce a satisfactory cabbage crop although in some cases further application of small doses of fertilisers might be beneficial.

But such cultivation on a field scale is not possible on all lands. In the early stages of the cabbage crop, in particular, frequent watering of the plants will be necessary, especially, when rainy days are far apart. Otherwise the plants do not come up very well. Until the "heads" are formed, fairly regular watering will be necessary. Therefore, only such soils, which are near sources of water supply, can be utilised for the cultivation of cabbages. For this reason, only lands on which an irrigated crop of potato is raised are chosen for growing cabbages. The area under such irrigated crop is small and the crops are therefore raised in different months in different parts of the district. The most common seasons are February and July.

The irrigated crop of potatoes which is the most common is the February crop. This crop is harvested in June and as at this time the available supplies of potatoes are small, ryots generally get good prices for the potatoes. On account of this, the area under the irrigated crop has increased in recent years. The harvesting of this crop in June will be followed by cabbages which are planted in July-August. The cabbages come to the market in September to November according to the early or late variety grown.

The other main irrigated crop of potatoes is in July. The crop is harvested in Nov-Dec. Cabbages will follow in December-January and these will come to the market in March to May for the "Nilgiri season".

Besides the above two well marked seasons cabbages are grown on a small scale in other months also, especially in the market gardens.

The area of plots on which cabbage is grown varies considerably. In market gardens it might vary from a fraction of a cent to 2 or 3 cents each. As a field crop the area of the plots will vary between half an acre to two acres. Generally cabbages are grown in the same field only once in two years. There are many villages on the Nilgiris where cabbage is grown as a field crop and the more important of them are Adashola, Kadanad, Anikorai, Kothamudi, Ithalar, Davane, Bygamund, Jagathala, Nedugula, Sulligudu, Hittagal, Koonsholai. It is not possible to give even an approximate idea of the total area under cabbage

in the district but it may be roughly estimated at not less than 300 acres.

The varieties of cabbage differ considerably in the rapidity of growth and they are classified into "early" and "late" varieties. Early varieties generally reach maturity of "head" in 80 to 100 days while the late varieties require 120 to 150 days. They may also be classified according to the shape into "Drumheads" with flattened spherical heads and "Ox-hearts" which have oval or bluntish cone-shaped heads.

Cabbage growers on the Nilgiris generally get their seeds from the seedsmen in Poona. The varieties largely grown are Cape Largest Drumhead and Cape Early Drumhead. The price of seed varies between Rs. 5 and Rs. 6 for 4 oz. Four to six oz. of seed, according to the variety, are required to plant an acre.

A well-drained spot is selected for the seed-bed. A fairly large quantity of cattle manure is thoroughly incorporated with the soil. Seeds are sown broadcast in the prepared bed and the bed is watered. The seed is sometimes sown at intervals of time in such a manner as to provide seedlings for transplanting at intervals so that there may be production of crop for a longer period of time. The seeds generally germinate in 10 days. When the plants have come up well they are thinned out carefully so that there may be no overcrowding. When the plants are about 6 inches high, that is, in 30 to 40 days after sowing, the seedlings are lifted carefully, allowing some soil to adhere to the roots, and then transplanted in the prepared plot. Circles of about 6 inches radius are marked after forking and pulverising the soil, cattle manure is placed within each circle and it is mixed thoroughly with the soil, and then the seedlings are planted at the centre of each circle. The plants are generally 2 to 3 ft. apart according to the variety of the plant.

After transplanting, the plants must be watered frequently, especially in the absence of rains. About a month after transplanting, hoeing is done, and if the plants show poor growth, fertiliser is applied at the rate of 4 to 6 cwts per acre. Sometimes a smaller dose of the fertiliser is applied before transplanting. But this is not general.

After the hoeing and manuring the plants will grow rapidly and in a few days heads will be formed. One more hoeing is given. Heads will mature in 60 to 90 days after transplanting according to the variety. Watering is not necessary after the heads are formed unless there is continued absence of rain for over ten days or a fortnight.

Generally the growth of the plants is not uniform so that, when some plants might be ready to cut, others might be immature. This is an advantage as supplies of cabbage can be had for a fortnight or longer from the same field.

No attempt is made to produce seed and the growers are content with getting their seed from the Poona seedsmen. According to a writer, "this is not greatly to be regretted, because hereditary

influence is not strong in cabbage. A first class variety removed to a different soil and climate soon loses the characteristics for which it is valued, and as the seed is not heavy or costly, it is better to get yearly supplies from a merchant whose business is to know where the best seed is procurable than to try to save seed in India".

The principal insect pest of cabbage on the Nilgiris is the caterpillar which eats the leaves. Besides hand-picking to some extent no other remedy is adopted by the ryots. The "Club-Root" disease is not prevalent in any appreciable extent. The "Black-Rot" disease is sometimes met with. For this also the ryot does not apply any remedy.

The cabbages produced on the field scale do not keep as well as those produced in kitchen gardens or by market gardeners. They have a tendency to rot. Cabbage should therefore be used as fresh as possible.

The cost of production of cabbages on the Nilgiris depends on several factors of which the following are the more important.

1. The expenses for the preparation of the soil for the transplanting of the seedlings will depend on whether the land is cultivated by the owner putting his own labour or by his employing hired labour for the purpose.

2. This will also depend on the nature of the soil and on the time that has elapsed between the harvesting of potatoes and the planting of seedlings and on whether there has been rain in the interval.

3. Raising one's own seedlings is less expensive than to buy seedlings from others. Seedlings cost between 4 annas and 8 annas per 100 according to the season and according to demand and supply.

4. The extent to which manuring with cattle manure and with fertilisers varies considerably. Ryots are aware of the fact that liberal manuring of the cabbage crop with fertilisers tends to produce a heavy crop and the quantity of fertiliser used depends on the ability of the ryots to buy the fertiliser. The extent to which fertiliser is used not only determines the cost of production but also the return which the ryot gets from the crop. It is therefore a very important factor.

5. The weather conditions and the quality of the seedlings produced will determine the extent of watering required. So the expenses under this head are variable.

6. Hoeing at intervals of ten to fifteen days helps the production of large heads. Generally not more than two hoeings are done. Some growers give only one. The expenditure on this item is therefore variable.

7. Transport facilities also affect the cost of production.

Considering all the above factors it is not possible to give any exact estimate about the cost of production of cabbage on the Nilgiris. It ranges between Rs. 100 to 150 per acre. An acre of cabbages would contain between 6000 and 7000 plants according to the variety used.

The marketing of the Nilgiri cabbages has to be made more efficient if cabbage growing on the Nilgiris is to pay. The market gardeners in and around the towns in the district grow cabbages only on a small scale and they always grow it along with other vegetables. The quantity they have to dispose of is not usually large and they generally sell their produce in the local shandies principally to consumers who generally pay fair prices. It is the grower on a large scale that suffers. His crop may be bought outright by some of the vegetable dealers in big towns such as Coimbatore, Salem, Trichinopoly etc. who may either fix a lump sum for the produce in the field and will arrange to cut the crop according to their necessity, and at their expense, or they may undertake to buy the whole crop and pay at an agreed rate for the quantity that they take from time to time. Some middlemen who act as suppliers of vegetables to the important towns in South India may also buy the crop in either of these ways.

Those growers who do not find such buyers take their crop every week to the local shandies and there sell them at the prices prevailing in the market. Merchants from the moffusil or their agents may also buy in large quantities for despatch to the principal towns.

If difficulty is experienced in not getting suitable buyers some growers who have their own lorries take loads to the various towns and there sell the lot at the best prices obtainable. Some others who have no such facilities may take their crop to some mundies at Mettupalayam who undertake to sell them, acting as commission agents. They get a commission of 6 pies per rupee.

The price obtained by the grower depends on several factors. In the months of April to June when the Nilgiri season is on, good prices are obtained because there is a much larger local demand and at that part of the year the competition from local produce in the large towns will also be less. At this period the price obtained by the grower ranges between Rs. 7 and Rs. 10 per 100 cabbages. After July prices go down and at the present time (October 1936) the prices range from Rs. 3 to 5 per 100. Recently one grower who had about 15,000 plants in 2½ acres in Ootacamund town sold his whole crop for Rs. 500. The buyer has to remove the cabbages from the field at his cost. They were bought by a vegetable dealer of Coimbatore who transported the whole produce to Coimbatore taking one or two loads a day. Another grower in a village near Kil-Kotagiri sold his crop of about 20,000 cabbages at the rate of Rs. 3 per 100. The buyer had to remove the crop from the field at his expense and he paid for the quantity removed then and there. At the time of writing, cabbages are sold at the rate of Rs. 2-8-0 to Rs. 5 per 100 at the Ootacamund weekly shandy.

Taking the average cost of cultivation at Rs. 125 per acre and the present selling price as Rs. 3 per 100 and 6000 plants per acre, the profit to the grower comes to Rs. 55 per acre.

# JASMINE CULTIVATION AND MARKETING IN COIMBATORE

BY R. RATNAM, B. A.

**Introduction.** From time immemorial the jasmine has been under cultivation all over India for its sweet scented flowers. Watt (1890) records a number of uses that the plant is put to. *Jasminum grandiflorum* is reported to be extensively cultivated in Europe for extraction of the scent from its flowers. In South India, *Jasminum grandiflorum* and *J. sambaca* are very widely grown. *J. flexile* is also common. Its flowers are almost like those of *J. grandiflorum*. They are not, however, sold in the market as it is considered that they are inferior to *J. grandiflorum* in the matter of their scent.

**Cultivation.** *Soil.*—In Coimbatore, loamy garden soils are best suited for the cultivation of all varieties of jasmine, while clay soils are unsuited since the luxuriant vegetative growth that results reduces the yield of flowers. In gravelly soils, though the plants present a stunted growth, flowers are plentiful. It should, however, be added that the cultivation of jasmine in gravelly soils is much more difficult than it is in loamy or clay soils.

**Planting**—For planting jasmine, round or square pits about 2 or 3 feet deep and 1½ feet wide are dug at a distance of at least about 12 feet from one another. Pits are filled with fresh earth stored for the purpose. *Jasminum sambaca* (Tamil: *malligai*) is propagated by cuttings while *J. grandiflorum* (Tamil: *mullai*) is grown by layering, as cuttings are found to be unsuccessful. Vines of *J. sambaca* about 3 or 4 feet long cut from a fairly mature plant and rolled in coils about a foot in diameter are planted upright in the pits dug, with the cut ends buried about 6 inches under the soil. Where propagation is by layering, the planting is done at a depth of about a foot. Rainy season is best suited for the purpose. In about two months fresh shoots begin to grow. Young plants are watered every alternate day.

**Propping.**—Jasmine is a straggler by habit. As the shoots of the young plant spread out, they are supported by tying them loosely to sticks fixed close to the plant. When they have come about three feet high, they have to be properly trained on what is known in Tamil as a *Pandal*—a scaffolding arrangement made from bamboos for the creeper to spread. The trouble with high *pandal* is that the picking of flowers has to be done by climbing over them which is very inconvenient. There is also a belief that during the hottest part of the day, the exposed stone pillars which are usually used as standards, get heated and injure the vines encircling them. In some gardens drumstick (*Moringa*) plants are grown (for live supports) just when the

jasmine is planted so that by the time the standards have to be provided, these *Moringa* plants are tall enough to serve as verticals for the scaffold work. With a view to avoid shade, the branches of the drumstick trees are often lopped off. This appears to be a very easy and cheap method.

**Flowering.** In three or four years, jasmine plants begin to flower and the yield increases year after year. Each plant spreads to a radius of about six feet all round. Especially during the flowering season, shade should be strictly avoided. Flowering season varies with different varieties. *Jasminum grandiflorum* which is most profitable, commences to flower in March and continues to be in bloom till October or November. This period roughly covers both the monsoon rains. *J. sambaca* which is less paying, flowers between March and June or July. The flowering period is usually divided into three well-defined stages. Each phase of flowering covers a period of a week during which flowers are produced profusely. Then there is an interval of about a month between one flush and the commencement of the next.

**After Cultivation and Manuring.** Reviewing briefly the annual cultural operations, it may be stated that soon after the cessation of flowering in October-November, all watering is completely stopped. With the advancement of the cold weather, the plants begin to shed leaves. Early in January the leaves in *Jasminum sambaca* plants are completely removed and the branches are also lightly pruned. During this season no water is supplied. The plants are also dug round so as to expose the roots. They are left in this condition for about a month. Horse or donkey manure with about a fourth of tank silt, if possible, is applied at the rate of about 20 lb. per plant, and covered by replacing the earth removed from round each plant. Pan shaped beds are then made round the plants to hold irrigation water. These operations will go on till about the middle of February. At the commencement, watering is done very moderately, and the dormant vegetative buds start growing very quickly. At this stage of vegetative growth, water is supplied sparingly so as to avoid luxuriant growth lest the crop of flowers should decrease. In a fortnight or three weeks flower buds appear. This indicates the time for profuse watering till the close of the first stage of flowering. With the close of each such stage, watering is stopped completely for about a month till the appearance of fresh flower buds indicating the time when watering is to commence.

In *Jasminum grandiflorum*, the main operations outlined above are almost the same. As in *J. sambaca*, withered leaves are removed and useless and weak branches are also trimmed. To effect complete exposure of all parts of the branches to bright sunlight is the chief object in thinning out branches. Digging and manuring are done as detailed above except that equal parts of tank silt and horse manure at the rate of 25 lb. of the mixture per plant are applied. Watering is

also done in a manner similar to *J. sambaca*. Flowering, however, is continuous in *Jasminum grandiflorum*.

*Details of economic returns from a garden with special notes of its management.*—In a garden which is about  $2\frac{1}{2}$  miles from Coimbatore, there are 31 bushes of *Jasminum grandiflorum* planted in an area of about 3700 sq. ft. (about  $8\frac{1}{2}$  cents) in two blocks. Out of the 31 plants, 3 are about two years old, 3 more are over ten years, and the rest between six and ten years. The arrangement for watering these plants deserves special mention. A masonry cistern about  $4' \times 3' \times 2\frac{1}{2}'$  and capable of holding about 185 gallons of water is situated very near a deep well in the garden. This cistern is filled by two women coolies drawing water by means of a pulley. The cistern is filled thrice within a working day of 8 hours, and the women are paid at the rate of two annas for each fill. The nearest jasmine plant is about 100 feet from the cistern and water is led through masonry channels. After each fill, water is released from the cistern by means of a plug at its bottom. It is reported that on an average about three cisterns per day during the season will irrigate all these 31 bushes which are more than two years old, once in four days.

The following is the summary of the record of yield obtained in that garden.

*Yield of flowers*  
(in Madras Measures).

	1934	1935	1936
January ... ..	...	...	...
February ... ..	...	...	...
March ... ..	7	26	4
April ... ..	4	11	15
May ... ..	39	21	89
June ... ..	109	28	110
July ... ..	180	45	110
August ... ..	56	40	77
September ... ..	44	119	12
October ... ..	18	22	5
November ... ..	32	...	12
December ... ..	3	...	...
Total. ...	492	312	434
Gross income	Rs. 118	82	115
Expenditure on watering, manuring, gathering flowers, spraying etc.	Rs. 79	67	73
Net income	Rs. 39	15	42
Calculated income per acre (approximate)	Rs. 460	180	500

The price during all these three years was the same. In this garden extensive damage due to jasmine bug was observed during the flowering season of 1935. It was only when the flowering season had far advanced that the existence of the pest was first noticed. The fact



was immediately reported to the Agricultural Demonstrator in the first instance, who arranged with the Government Entomologist for spraying with fish oil resin soap, and the pest was effectively brought under control, though late, after sustaining a heavy loss. During February 1936 the pest was again noticed and by the timely application of the same remedial measures, it was quickly brought under control. The owner of the garden in question fears that his neighbouring gardens are also infested and his efforts to influence his neighbours have met with little success.

A few remarks are necessary in regard to the method of picking flowers. Boys less than 14 years are employed for picking flowers. Each boy gathers, on an average, about one Madras Measure within two hours. The wages paid to boys are calculated at the rate of one pie ( $\frac{1}{2}$  anna) per ollock ( $\frac{1}{8}$  Madras Measure).

**Marketing and Prices.** As in all other agricultural crops, the question of marketing jasmine flowers is becoming more and more difficult. Unlike commodities like grains, these flowers being perishable, their maximum utility has to be achieved in a very short time. Hence the dealer should make the maximum amount of profit in the minimum time with the minimum of merchandize. He keeps his shop open from 8 A. M. till about 10 P. M. Either he sends his boy servant to the gardens, or the gardeners themselves deliver the flowers by about 10 A. M. In the localities around Coimbatore, the gardener usually takes up the responsibility of gathering the flowers and delivering them to the salesman. The gardener starts picking flowers by about 6 A. M., and finishes by about 9 A. M. so as to enable him to deliver the produce at the shop by about 10 A. M. At that time the buds are unopened and it is said that there is an increase in the volume by about 10 per cent before they are sold in the evening. Ordinarily purchasers go to flower bazaars only after 3 P. M.

**Trade at Coimbatore.** Peculiarly enough, almost all the dozen florist shops in Coimbatore are in the hands of Muhammadans and they appear to be experts in this line of trade. Besides, during the past four years, large scale street vending which till then was almost totally unknown, has come into vogue.

Some of the local florists who also own gardens have now found new competitors from Dharapuram side which is about 50 miles from Coimbatore. It is reported that in and around Dharapuram very large gardens have been established. With the aid of petromax lights, picking of buds is commenced at about 3 A. M. or 4 A. M. and the buds are packed in baskets and transported to Coimbatore by means of motor bus. This produce reaches Coimbatore market by about 10-30 A. M. It is said that these consignments are delivered in Coimbatore at 5 or 6 Madras Measures per rupee.



As for the total quantity of flowers available for Coimbatore market during each jasmine season, one of the flower merchants estimates it at about 400 Madras measures of Dharapuram flowers and about 1200 Madras measures of Coimbatore flowers. No details are available to check up these data, and they have to be taken with reserve.

*Price and Trade Aspect.* No exact figures are readily forthcoming regarding the cost price of flowers paid by the dealer. It is believed that at present he pays at the rate of a rupee for 3 to 4 Madras measures. Prior to 1932, the price was only a rupee for 2 Madras measures, but the competition of Dharapuram and the economic depression have brought down the prices to nearly half the original rates. It is definitely known that the cost price has nothing to do with the ability of the trader to sell all the quantity purchased by him. He generally purchases all the produce grown in a particular garden at a flat rate. Prior to 1930, when there was a dearth of flowers, the trader used to visit gardens in the neighbourhood of Coimbatore and contract with the gardener for the sale of the whole produce of the garden during a particular season. But now, the cost is calculated by the trader on the basis of the total quantity of flowers actually purchased by him day to day.

The sale price of flowers varies with the time of purchase on one and the same day. During early evenings prices are very high. A rate of Rs. 3 per Madras measure is very often quoted. But late at night, say at 9 P. M. or 10 P. M., the trader is anxious to dispose off as much as he could and the price falls to 4 annas per Madras measure which is perhaps just his cost price. During marriage and festive seasons, the prices range from as. 8 to Rs. 3 per Madras measure depending on the time of purchase.

The trader has usually an assistant who is paid a daily wage of 6 to 9 annas. Flowers are tied up sparsely along a piece of plantain fibre. It may be taken that one Madras measure will yield a length of 12 yards. The length, of course depends upon the closeness of the arrangement of flower. When there is a keen demand for tied flowers accompanied by a dearth of flowers, the assistant manages to get more than 16 yards from one Madras Measure of flowers. The cheapest rate for tied flowers is six pies ( $\frac{1}{2}$  anna) per yard. Here also the sale price has no relationship to the cost price, as the object is merely to make as much profit as possible in a short time.

Garlands for ceremonial occasions cost not less than 12 annas each. There are several varieties of such garlands with more or less amount of ornamental work and lace tuckings. From one Madras measure of flowers not more than six garlands can be made.

The jasmine trade is characterized by its uncertainty. Late at night all unsold flowers are tightly rolled and packed in plantain leaves.

The next morning the buds remain half open and a portion may be sold till fresh flowers arrive in the market. No pains are spared to scrape every copper that can possibly be obtained. It is perhaps the uncertainty of the trade that accounts for large variations in the prices. False accounting, dilatory tactics, wrong measures and breach of contract are of very common occurrence among these petty dealers.

*The Future.*—The economics of cultivation given elsewhere would indicate that jasmine cultivation should prove profitable; but the demand for flowers appears to be limited. There is therefore very little prospect of any large expansion taking place in the area under jasmine cultivation in Coimbatore, unless extraction of scent is carried out. No information is, however, available as to whether scent extraction can be profitably undertaken.

**Summary.** Details of planting jasmine and cultural operations that have to be carried out are given. Data from actual records from one of the gardens at Coimbatore are furnished with particular reference to its management. The state of the local market is then outlined. It is concluded that any large expansion in the area under jasmine cultivation in Coimbatore is not likely to be profitable under the existing conditions.

**Acknowledgments.** I am much indebted to Mr. C. S. Ramakrishna Ayyar for the data furnished by him.

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## SOME ASPECTS OF MALNUTRITION IN DAIRY COWS

(By J. C. J. MAUNDER, B. V. Sc.)

In dealing with this subject, I do not propose to describe any diseases caused by or attributable to malnutrition. I shall give you no details of rations to be fed to avoid malnutrition, but will endeavour to awaken you to the realities of malnutrition, for as soon as the dairy farmer begins to realise that malnutrition is a live and real thing, then shall the time be ripe to deal with the problem in greater detail.

Malnutrition can be defined as the inability of the animal to derive the raw materials necessary for maintenance of health and milk production from the available food supply.

The majority of holdings on which dairying is practised in Queensland do not satisfy the complete requirements of the dairy cow, and it is therefore necessary to supplement the grazing with hand feeding, or, on the better class of country, grazing on supplementary fodder crops such as oats, lucerne, cultivated grasses, &c.

Dairying "off grass" can only be successfully practised on the very best of our scrub lands, and to attempt it elsewhere is merely to court disaster, or, at best, a life of hard work and stagnation.

To understand the fundamentals of its requirements, it is essential to appreciate the fact that the modern dairy cow is an animal far removed from its wild prototype, and as careful breeding and selection has evolved an animal to produce a milk supply far in advance of that which nature intended, and as this factor of milk production is accentuated, so then is the necessity for supplementary feeding increased.

Nature intended cattle to roam at will with ample opportunity for selective grazing; they bred but once a year, and produced only sufficient milk to rear one calf. The modern dairy cow is confined to small areas, is expected to breed at any time of the year, having a regular oestrus cycle of approximately three weeks, and has to produce an amount of milk enormously greater than that necessary to rear a calf.

It must be obvious that something far beyond the provision of natural pasture is essential to enable this modern dairy cow to perform the functions expected of her, and there is not the slightest doubt that the failure on the part of the farmer to recognise this state of affairs has paved the way for many of the troubles that beset stock to-day.

Let us consider, briefly, the requirements of a dairy cow.

Firstly, food stuffs must supply the energy necessary for the performance of all the vital functions, and this energy is, to a large extent, supplied by the grasses consumed in ordinary grazing.

To build up the tissues and to replace wear and tear, proteins are necessary, and, because of the additional protein requirements of the dairy cow to maintain the almost constant figure in the milk secreted, special efforts must be made to supply proteins in addition to that available in ordinary pasture plants.

A minimum mineral content of food stuffs is essential to maintain vital functions, and an additional supply of minerals is necessary to satisfy excessive demands of milk secretion and reproduction.

In determining a suitable ration to be fed to a dairy herd, it is not advisable to decide on a definite ration—so many pounds of this and so many pounds of that—rather decide on a basal ration, varying it according to the prevailing climatic and pastoral conditions, and amount of milk produced by the animal.

Where ample grazing is available, it would be unsound to feed large amounts of bulky fodders, chaff, hay, silage, &c. Protein concentrates are indicated such as the various meals, linseed meal, cotton seed, maize meal, cocoanut oil cake, plus small amounts of bulky food.

On the other hand, where grazing is poor, for example during winter, the ration must contain larger amounts of the bulky fodders necessary to distend the digestive tract, compensating for the defective grazing. In cold weather, with great loss of body heat, extra feed is needed to make good this loss and maintain body heat. This factor of additional feed to maintain body heat is strong point in favour of rugging cattle in hard winters, the amount of feed thereby saved will amply repay the monetary outlay involved.

The mineral ration should remain constant throughout the season, varying only for individual cows according to the milk produced, as all our pastures tend to be deficient in essential minerals, particularly lime and phosphoric acid irrespective of seasonal conditions.

With reference to minerals and the dairy cow, if you are to understand the particular requirements you must appreciate the following facts.

The percentage of minerals present in the milk secreted is almost constant. Take two similar cows producing equal amount of milk of equal quality, one getting a full mineral ration and the other a low mineral ration. Notwithstanding the difference in minerals supplied, the actual amount of minerals being

secreted daily in the milk is approximately the same in both animals. Where then does the mineral content of the milk come from in the case of the cow receiving a low mineral ration; it is actually derived from the reserves stored in the tissues of the animal. It has been shown in one particular case, that a cow was secreting in the milk just five times the amount of lime present in the daily ration.

It is easy to imagine to what extent this animal's lime reserve would be drawn upon throughout the lactation period. This sort of thing cannot go on, and the inevitable happens in the fundamental breakdown of the animal, manifested by one or more of the particular conditions peculiar to dairy cattle.

I assure you, that even on the best of country where supplementary feeding has not been necessary, the feeding of minerals must be practised if the maximum efficiency is to be obtained.

The most important function of the dairy cow is that of reproduction, and if a cow fails in this obligation, she no longer becomes profitable, and must be culled.

Undoubtedly, a great economical loss is represented by the large number of dairy cows affected with temporary or permanent sterility. Remember my remarks pointing out the difference between the reproductive obligations of the undomesticated cow and those of our modern dairy cow, and you must realise that some particular attention is necessary if the unnatural demands of reproduction are to be fulfilled.

Undoubtedly many of the problems of sterility are directly associated with malnutrition, and the more readily the problem of malnutrition and its relation to regular reproduction is appreciated, the more successfully are farmers likely to combat sterility.

My final reference is to dry stock—remember that although the dry cow is not producing any milk, she is providing or attempting to provide sufficient nutrition to an embryo calf in the final stages of its uterine life, and considerable demands are therefore made on the maternal reserve.

I ask, therefore, that the dry cows receive the attention that is their due when the problem of malnutrition is receiving the consideration that is essential for the successful practice of dairy farming. (*Queensland Agricultural Journal*, Vol. 46, page 67 July 1936.)

## EXTRACT

**Land reclamation in Italy.** One of the achievements of which Italy can unreservedly be proud is the reclamation of large areas of land that for centuries remained marshy.

An idea of the vastness of the operations and their popularity may be gauged from the following figures:—

Labour employed.	18 million, man days.
Area reclaimed.	47 million, hectares.
Increase in out put.	2 million metric tons.
Fall in imports %.	about 80.0

Of much greater interest perhaps to this country is the way in which the Italian Government tackled what is known as the "Southern Question" consisting of a group of problems arising out of the backward economic and social conditions of South Italy. The general machinery is prescribed by the Mussolini Act which characteristically does not lose itself in the maze of existing measures. It leaves them as they are and goes straight forward. Financial provision of 7000 million lire is made to be spent in the course of 14 years. Half of this amount is chargeable to the treasury and the remainder to the land owners. The

major part of the finance is provided to the parties concerned in the form of 30 year annuities discounted to them by different institutions.

The scheme aroused such great enthusiasm that applications for funds were so numerous that the allotted sum was found far too small to meet them all. Preference was given for the execution of the work by public bodies which ensured a certain minimum of private initiative. Private rights were acknowledged and when curtailed, were said to be adequately but not excessively compensated. A special section of the Ministry of Agriculture which receives proposals and itself draws up plans, deals with land reclamation and no project is accepted unless it shows considerable possibility of securing notable improvements in hygiene, demographic, economic, and social conditions. The plan being accepted by government, the land owners proceed to execute the works either by themselves or through the consortium. They may provide all the money themselves or obtain government grants or special loans from the agricultural bank.

When the reclamation is completed, some internal migration and land settlement become necessary. A special commissariat like the "Ex-service Men's League" attended to this and the migrants were drawn mainly from farm workers brought from more densely settled regions. The system adopted was as follows:—The reclaimed land is cut up into holdings of 25 to 75 acres according to the quality of land each furnished with a house, stabling for ten cattle, poultry run, pig sty, well etc. The farms are taken by the immigrants first on a crop sharing basis the tenants receiving monthly advances in the shape of supplies and cash allowances from the League or other societies. When the head of the family gets experienced, an agreement is drawn up under which he will purchase the farm and the livestock from the League in 15 annual instalments covering capital and interest which varies in general from 200 to 630 lres per hectare as cost of upkeep and amortisation of the drainage work. These repayments do not cover the government contribution.

(One hectare = 2.47 acres ; 1 metric ton = 2000 lbs. ; 1 lire = 9½ d.)

(Extract of a lecture on land reclamation in Italy by Sir John Russel.)

## Agricultural Jottings.

BY MEMBERS OF THE DEPARTMENT OF AGRICULTURE, MADRAS

**The Madras Dry Farming Scheme.** The Madras Dry Farming Scheme, which was started just over two years ago, has for its purpose the improvement of agriculture in the arid parts of the Presidency. The Research Station where the work is in progress is situated at Hagari in Bellary district.

An account of the progress made in the first year has been published already. The following notes give further general information about work done in the last season, and the manner in which it may be useful to the ryot.

The progress made lies in two general directions viz., improvement of the crop, and improvement of the soil.

**Improvement of the Crop.** *Korra.* This millet, which is one of the main food crops, has been studied intensively. It has been found in any crop grown under ryots' conditions that the plants differ in one important respect and that they are generally of two kinds. Some have a shallow spreading root that penetrates to depth of only about 6", while others have a different kind of root which grows deep in the soil up to 2 feet and even 3 feet. It has been found that the deep rooted kinds are most numerous which is evidently nature's way of providing a kind of plant adapted to resist drought. But what of the shallow rooted kinds that are present, although not in such large numbers? The information obtained

up to the present seems to show that the latter may frequently give the best yield in seasons when the rainfall is heavy or ill distributed. The reason is heavy black soil is soon spoiled by heavy rain which interferes with growth. In a season of light rainfall, which is usual in the district, the deep rooted varieties do best, but when too much rain falls at one time, the shallow rooted kinds may give more grain.

It is well known that on many holdings there are high-lying lands, medium level fields, and low lying areas. Crops grown on the ridge suffer much more frequently from drought than on low-level lands. It is possible, therefore, that deep rooted plants will do best generally under such conditions, whereas the shallow rooted kinds may be more suited to low-lying areas. New strains of Korra have been isolated. During the season these were compared not only at Hagari but on a number of ryots' fields. This line of work continues to be promising.

*Jonna.* The importance of Jonna as a food is well known in the Ceded districts. A common source of loss to the ryot is the frequent appearance of an inferior Jonna plant in fairly large numbers and in almost all crops. This is called "Jadu choppa". These plants do not produce an earhead and the cause has been traced to impairment of the root system. Efforts are being made to eliminate this loss.

*Cotton.* In Bellary district early season or 'mungari' cotton is grown on about 2 lakhs of acres annually. The mixture grown frequently by the ryots spins up to not more than 15—18 highest warp counts. The lint is of inferior quality. As a result of new importations from other parts of India, a cotton of much superior quality which spins to 32's has been obtained. The variety which comes from Berar is called Verum. Wherever this cotton has been grown, it has proved to be equal in outturn of lint, as compared with the local low grade mixture. Further, it has been well reported on by a section of the cotton trade and the department of agriculture has been requested to ensure its wide cultivation.

With the advent of new strains of this variety as a result of two seasons' work, the ryot now has two types of proved quality, one for cultivation in the early season and another for sowing later.

*Improvement of the soil.* In the Bombay Presidency where the rainfall in quantity is about the same as in Bellary and Anantapur districts, it has been shown that as much as fifty per cent of the rainfall may be lost to the crop. This is caused in part by unsuitable cultural methods.

A similar problem exists in parts of the Ceded districts and it is being overcome to some extent by the erection of small field bunds. The implements used for this purpose is simple in design and can be drawn by a medium sized pair of animals. It costs Rs. 7—8—0. The year before last an experimental crop of cotton yielded 51 per cent more kappas than unbunded land, and last year the difference in a Jonna crop was 31 per cent in favour of the new method. Further, there has been a cumulative rise in yield per acre.

In the past the problem of drought in Utah, U. S. A. has been acute. As a result of twenty five years' experience much progress has been made in designing methods of tillage conducive to the storage of rain in the soil. It has been found that in time if land is cropped in alternative years instead of every year, the yield will double itself.

The Anantapur ryot seems to understand this practice to some extent, but his methods need improvement. A study of the possibilities of cropping in alternative years is to be undertaken at Hagari. It has been found during one season that a cotton crop can deplete the soil of moisture to an extent of 7,98,700 lbs per acre. This compares with as little as 2,55,200 lbs. per acre when no crop is grown.

An Officer of the Madras Agricultural Subordinate Service has been sent to America to study methods of dry farming practice. With his knowledge of the Ceded districts he should learn much that will be of use in improving methods of cultivation in Bellary and Anantapur district.

**The place of other crops than Paddy in the Tanjore Delta.** It is well known that over a million acres of land are devoted to cultivation of paddy annually in the Tanjore District without rotating it with any other crop. Of this area, about  $1\frac{1}{2}$  to 2 lakhs of acres are cropped with paddy twice a year while the rest of the area is devoted to a single crop. When paddy prices were ruling high at Rs. 2—8—0 to Rs. 3—0—0 a kalam of 64 lb. there was a decent margin of profit left for the cultivator even from a low average yield of 30 kalams per acre. But with the fall in price of paddy ranging from 40 to 60 per cent from 1930 onwards the margin of profit has become very narrow.

The immediate problem for the Department was to find out whether there was any possibility of introducing with success other and more profitable crops in the wet lands of the Tanjore district. From 1930 onwards experiments with various commercial crops have been under way in the Paddy Station at Aduturai. The following crops were under trial on this station so far:—Sugarcane, plantain, groundnut, soy beans, Cambodia Cotton and turmeric.

**Sugarcane.** The trials conducted with sugarcane of various varieties have definitely established the fact that it is quite possible to grow fairly good crops of sugarcane in the paddy fields of Tanjore. The yields per acre ranged from 25 to 35 tons and it is reckoned that an average of 30 tons per acre could be realised under proper cultivation and management. The best time for planting canes is March and April.

Of the thin canes Co. 281 and Co. 285 have been found to do very well. These canes have the reputation of standing water-logged conditions. Among the thick canes, Co. 402 is a very good cane to grow and has been given to the cultivators for trial. Co. 419 and Co. 421 under trial for the second year on the station give promise of being suitable for the tract. Among the Sorghum cane hybrids, Co. 352, 353 and 355 have been found to do well. Of these Co. 352 is ready for harvest in about  $8\frac{1}{2}$  to 9 months.

Canes have been introduced in all the taluks of the district. It is also gratifying that mirasdars who were new to this crop, straightaway adopted along with the new canes, the up-to-date methods of cultivation. This is indeed a distinct gain.

**Plantain.** Generally plantain crop in the Tanjore district was confined to 'Padugai' lands adjoining river banks and it was seldom grown in paddy fields. The trial crops grown in the paddy fields during the last six years have shown that under proper cultivation fairly good crops of plantain can be grown in paddy fields of the district either for three years or more in the same field. But due to prevalence of cyclonic weather almost every year during the north east monsoon period when bunches appear on the plants, the plants have to be propped. It has been shown that it is quite possible to grow plantain in the paddy fields of Tanjore as is done in the neighbouring district of Trichinopoly.

Goovan and Monthan varieties are found to be the best varieties to grow. The cultivation of Mauritius plantain avoids the costly item of propping.

**Turmeric.** It has been possible to take very good crops of turmeric in paddy fields by growing it on raised beds with drainage channels at intervals. Yields varying from 16,000 to 22,000 lb. of green turmeric have been obtained. The only precaution to be taken is that the crop should be grown in July on raised beds and beyond the reach of stagnant water during the rainy months.



**Groundnut.** Trials made to grow groundnut in the single crop on samba fields as a catch crop before planting the fields to paddy crop during the season have proved to be very successful. Yields have ranged from 1,200 to 2,000 lb. of pods and 10,000 to 12,000 lb. of haulms which could be used either as green manure to the succeeding paddy crop or as excellent fodder for cattle. Being a legume, it enriches the field sown to it with nitrogen, the most needed plant food in our soils.

**Cambodia Cotton.** Trials to grow Cambodia cotton in between two samba paddy crops have proved to be of considerable promise. The cotton seeds are dibbled in lines in the stubble after the harvest of samba crop in January or February. With the available moisture, the seeds germinate and the young plants grow. With the help of summer showers the crop is given one or two courses of intercultivation with mammatty or a bullock-drawn hoe and earthed up. The crop is allowed to grow as best it can with the help of the moisture in the soil and the few summer showers. The crop is given irrigation after the receipt of water in the channels in June. Thereafter it makes very rapid growth and flushes well, bearing a heavy crop of bolls. A heavy picking can be taken before the rains in October when the crop is pulled out and the field planted to paddy. In the years of well distributed rainfall in summer, the yield of kappas from an acre has gone up to 900 lb. but an average yield of 300 to 400 lb. of kappas per acre is quite a possibility.

**Tips to those Interested in Poultry.** While quite a number of people like to keep poultry, their interest wanes as soon as they find things are going wrong. There has been of late, much awakening among villagers and townspeople to raise exotic breeds. While they are excellent both for the table and breeding purposes there are certain difficulties in the way of their becoming popular and remunerative at present. So long as they are subject to certain contagious and infectious diseases which play havoc among them, and so long as there are no specific remedies as at present, the safest advice one can give is to go slow in introducing such birds. Improvement can be achieved by selecting the best layers among the local types found in the country. Another way is to grade the local birds by mating the hens with good foreign cock, such as white Leghorns, Rhode Island Reds, Light Sussex, Black Minorcas, etc. By adopting these two methods alone a fair progress in the improvement of poultry could be effected.

An important point one should remember in raising poultry is that they should be housed in sanitary surroundings which should be dry, airy and roomy and should be protected against their natural enemies. The Department has in several of the agricultural farms types of poultry houses which can be adapted to suit local conditions. Poultry are subject to parasites like lice, mites, ticks, fleas, etc. which if not attended to promptly multiply rapidly and weaken the birds by sucking their blood. Therefore a good supply of disinfectant powders like a mixture of wood ashes and sulphur, sweet flag, tobacco, etc. to dust the birds should be available. Again, the birds should be fed regularly; to keep them in good condition different kinds of green food is essential. Clean water with a few grains of potassium permanganate in it should be within easy reach of birds. Also grit which would aid digestion and help in the formation of shell should be supplied.

A very important point to bear in mind always is that prevention of disease is better than cure; this is all the more necessary when no cure has been found for several of the ills of poultry. To this end, a place where the birds could be isolated as soon as the first signs of disease are noticed is very necessary. The rapid spread of diseases in the villages, is due to want of facilities in this direction. Therefore, poultry raising in villages becomes very unsuccessful. It is best that poultry are kept in fields as far as possible or in isolated places where



contact is not so intimate. In the case of diseases like chicken pox, inoculation as a preventive should be taken advantage of.

It should be the concern of every one who keeps poultry to periodically see if poultry keeping is a paying concern or not. Business methods are necessary at every step. Attention should be paid to proper marketing of eggs. Eggs should be examined first to see if they are sound or not. A good method is to place the egg against the sun or strong light and note the air space, condition of the albumen and yolk within the egg. Eggs should be graded according to their size and colour before marketing and prices fixed accordingly. If these suggestions are followed, it is possible to make poultry raising a paying proposition.

## Crop & Trade Reports.

### Receipt of raw cotton at press & spinning mills.

#### Total cotton pressed & unpressed

	Bales of 400 lbs. against an estimate of 540,700 bales for 1935-36.	Figures for corres- ponding period in previous years.
1-2-35 to 20-11-36	586,412	434,633
„ 27-11-36	592,688	439,278
„ 4-12-36	597,070	444,642
„ 11-12-36	603,272	449,964
„ 18-12-36	606,931	455,964
„ 25-12-36	610,882	458,876
„ 1-1-37	616,044	462,558

	Cotton bales received at Mills.	Exports by Sea.	Imports by Sea.
1-2-36 to 20-11-36	336,378	239,524	95,934
„ 27-11-36	372,368	243,623	96,593
„ 4-12-36	378,560	248,312	98,525
„ 11-12-36	384,639	251,145	98,704
„ 18-12-36	389,220	253,775	99,484
„ 25-12-36	391,906	254,967	99,567
„ 1-1-37	396,169	259,065	99,843

**Paddy—Second forecast report.** The average of the areas under paddy in the Madras Presidency during the five years ending 1934-35 has represented 13.4 per cent of the total area under paddy in India.

The area sown with paddy up to the 25th November 1936 is estimated at 8,504,000 acres. When compared with the area of 8,410,000 acres estimated for the corresponding period of the previous year, it reveals an increase of 1.1 per cent.

The increase in area occurs in Vizagapatam, West-Golavari. Kurnool, Chingleput, Trichinopoly, the South and West-Coast. There is a marked decrease in area in Nellore (130,000 acres) owing to the unfavourable season.

The first crop has been generally harvested throughout the Presidency.

Normal yields have been reported from all districts outside the Circars (Vizagapatam excepted) Bellary, Anantapur, the Carnatic districts, North Arcot and Salem. The severe cyclone of the 28th October lodged the crop in parts of East Godavari, West Godavari, Kistna and Guntur.

The seasonal factor for the Presidency works out at 98 per cent of the average as against 95 per cent in the corresponding period of the previous year.

The wholesale price of paddy per imperial maund of 82 2/7 lb. as reported from important markets towards the close of November 1936 was Rs. 2-14-0 in

Vizianagaram and Madura, Rs. 2-13-0 in Cuddapah, Rs. 2-11-0 in Salem, Rs. 2-10-0 in Nellore, Rs. 2-6-0 in Nandyal, Vellore and Erode, Rs. 2-5-0 in Guntur, Rs. 2-1-0 in Cocanada, Rs. 1-15-0 in Tinnevely, Rs. 1-13-0 in Kumbakonam, Rs. 1-12-0 in Negapatam and ranged from Rs. 2-2-0 to Rs. 2-3-0 in the other markets. As compared with the prices reported for October 1936, the prices are stationary in Vizianagaram, Nellore, Vellore, Salem, Erode, Kumbakonam, Negapatam, and Tinnevely while they reveal a fall of one per cent in Trichinopoly and 2 per cent. in Cuddapah and a rise of 8 per cent in Cocanada and 2 to 3 per cent in the other markets.

**Sugarcane—1936—Intermediate Report.** The cyclone of the 28th October 1936 lodged the sugarcane crop in parts of the districts of East Godavari, West Godavari, Kistna and Guntur. In the districts of Kurnool and North Arcot, the crop suffered to some extent from drought in the early stages of its growth. The condition of the crop is satisfactory in the other districts and the yield is expected to be normal if the season continues to be favourable.

The wholesale price of jaggery per imperial maund of 82-2/7 lb. as reported from important markets towards the close of November 1936 was Rs. 5-12-0 in Madura, Rs. 5-10-0 in Rajahmundry, Rs. 5-9-0 in Nandyal, Rs. 5-8-0 in Adoni, Rs. 4-15-0 in Bezwada, Guntur and Kumbakonam, Rs. 4-14-0 in Mangalore, Rs. 4-12-0 in Masulipatam and Tuticorin, Rs. 4-11-0 in Calicut, Rs. 4-7-0 in Erode, Rs. 4-5-0 in Ellore and Coimbatore, Rs. 4-2-0 in Salem, Rs. 3-11-0 in Bellary, Rs. 3-10-0 in Cocanada, Rs. 3-8-0 in Cuddapah, Rs. 3-4-0 in Trichinopoly, Rs. 3-2-0 in Vellore and Rs. 2-8-0 in Vizagapatam. As compared with the prices of the previous month, these prices reveal a rise of 30 per cent. in Rajahmundry, 11 per cent. in Trichinopoly, 8 per cent. in Salem, 7 per cent. in Kumbakonam, 6 per cent. in Coimbatore and Calicut, 4 per cent. in Guntur, 3 per cent. in Nandyal and one per cent. in Ellore and fall of 17 per cent. in Vizagapatam, 9 per cent. in Adoni, 5 per cent. in Cocanada and Cuddapah and 3 per cent. in Mangalore whilst they remained stationary in the other centres.

**1936-1937—Cotton—Third Forecast Report.** The average of the areas under cotton in the Madras Presidency during the five years ending 1934-35 has represented nine per cent. of the total area under cotton in India.

The area under cotton up to the 25th November 1936 is estimated at 1,982,100 acres. When compared with the area of 2,200,900 acres estimated for the corresponding period of last year, it reveals a decrease of 9.9 per cent.

The decrease in area occurs in all the important cotton growing districts outside Salem, Coimbatore and Madura. In the Deccan, the area has fallen from 1,169,000 acres to 961,000 acres i. e. by about 18 per cent. owing to want of timely and sufficient rains.

The area under irrigated cotton mainly cambodia is estimated at 198,800 acres as against 206,700 acres in the corresponding period of last year, a decrease of about 3.3 per cent.

Pickings of the early sown crop in Bellary are in progress and the yield is expected to be below normal. In the districts of East Godavari, West Godavari, Kistna and Guntur the crop has been affected to some extent by the cyclone of the 28th October 1936.

Normal yields are expected in all the districts outside East Godavari, West Godavari, Kistna, Guntur, Bellary, Anantapur, Cuddapah and Nellore. The seasonal factor for the Presidency works out to 96 per cent. of the average as against 100 per cent. in the previous year. On this basis, the total yield is estimated at 412,000 bales of 400 lb. lint as against 456,000 bales of last year, a decrease of 9.6 per cent. The crop is young and it is too early to estimate the yield with any degree of accuracy.

The estimated area and yield under the several varieties are given below :-

(Area in hundreds of acres, i. e. 00 being omitted, yield in hundreds of bales of 400 lb. lint. i. e. 00 being omitted.)

Variety.	Area from 1st April to 25th November.		Corresponding yield.	
	1936	1935	1936	1935
1	2	3	4	5
Irrigated Cambodia ... ..	Acs. 187,3	Acs. 196,2	Bales. 117,1	Bales. 122,7
Dry Cambodia ... ..	227,5	217,1	49,4	46,5
Total Cambodia ... ..	414,8	413,3	166,5	169,2
Karunganni in Coimbatore ... ..	102,0	95,5	23,5	22,0
Uppam in the Central districts ... ..	29,0	27,9	4,7	2,6
Nadam and Bourbon ... ..	18,5	2,6	9	1
Total, Salems ... ..	149,5	126,0	29,1	24,7
Tinnevellies* ... ..	311,0	344,0	80,1	88,6
Northerns and Westerns ... ..	961,0	1,169,0	111,1	146,2
Cocanadas ... ..	137,8	139,9	24,2	26,2
Others ... ..	8,0	8,7	1,0	1,1

\* Includes Uppam, Karunganni and mixed country cotton in Madura, Ramnad and Tinnevely.

The local cotton trade is not generally active at this time of the year. The wholesale price of cotton lint per imperial maund of 82-2/7 lb. as reported from important markets towards the close of November 1936 was Rs. 19-12-0 for Cocanadas, Rs. 25-11-0 for Red Northerns, Rs. 18-11-0 for early crop Westerns, Rs. 25-4-0 for Cambodia, Rs. 24-2-0 for Coimbatore Karunganni, Rs. 22-4-0 for Tinnevely Karunganni, Rs. 21-12-0 for Tinnevellies, and Rs. 21-4-0 for Nadam cotton. As compared with the prices in the previous month, the prices of Tinnevely Karunganni and Tinnevellies reveal a fall of about 4 per cent. and 2 per cent. respectively, and of Cambodia a rise of about 2 per cent. while the prices of the other varieties are practically stationary.

**Castor—1936—First or final report.** The average of the areas under castor in the Madras Presidency during the five years ending 1934-35 has represented 19.5 per cent of the total area under castor in India.

The area under castor in the Madras Presidency up to 25th November 1936 is estimated at 240,100 acres. As compared with the area of 247,700 acres estimated for the corresponding period of last year, it reveals a decrease of about 3.1 per cent. The estimate for last year was below the actual area of 252,291 acres by about 1.8 per cent.

There was an increase in area in East Godavari, Kurnool, Anantapur, Salem, Coimbatore, Trichinopoly and Madura which was more than counterbalanced by a decrease in area in the Circars (East Godavari excepted), Bellary, Cuddapah, Nellore and Chittoor.

The seasonal factor for the Presidency is estimated to be 97 per cent of the normal as against 88 per cent in the previous year according to the season and crop report. On this basis, the yield is estimated at 23,600 tons as against 24,300 tons estimated for the corresponding period of last year and 22,750 tons estimated in the Season and Crop report of last year.

The wholesale price of castor seed per imperial maund of 82 2/7 lb. as reported from important markets towards the close of November 1936 was Rs. 5-7-0 in Vizagapatam and Ellore, Rs. 5-6-0 in Vizianagaram, Rs. 5-3-0 in Rajahmundry, Rs. 5-1-0 in Cocanada, Rs. 5-0-0 in Bezwada and Cuddapah, Rs. 4-14-0 in Vellore, Rs. 4-12-0 in Masulipatam and Bellary, Rs. 4-11-0 in Trichinopoly, Rs. 4-9-0 in Nandyal, Rs. 4-7-0 in Salem, and Rs. 4-2-0 in Tinnevely. As compared with the prices reported at the corresponding date of last year, these prices reveal a rise of 14 per cent in Cuddapah, 9 per cent in Ellore, 8 per cent in Vizianagaram, 5 per cent in Vizagapatam, 4 per cent in Rajahmundry and Vellore and 1 per cent in Cocanada, Nandyal and Trichinopoly and a fall of 20 per cent in Bellary, 12 per cent in Tinnevely and 1 per cent in Salem whilst they remained stationary in the other centres.

## College News & Notes.

Mr. R. C. Broadfoot, Principal and Ex-Officio President of the M. A. S. U. returned from leave and took charge on 30-12-'36 from Mr. K. Ramiah who was in additional charge of the Principal's Office from 23-12-'36. Mr. R. W. Littlewood left for Hosur on 6-1-'37. The same day Mr. D. G. Munro left for Cochin enroute to England, on leave.

**Students' Corner.** The College reopened after the Xmas and New Year holidays on the 4th January. Students of the 2nd year B. Sc., have gone on tour.

## Departmental Notifications.

**Transfers & Postings.** Mr. N. Ganeshamurthy, A. D., Salem to be A. D., Harur; Mr. P. Appaswamy Pillai, A. A. D. on leave to be A. A. D., Salem; Mr. V. Satagopan, A. D., Coimbatore deputed to the Botanical Sub Station, Pusa for training in flue curing of tobacco; Mr. T. K. Thangavelu, A. D., Coonoor to be A. D., Coimbatore; Mr. K. G. S. Bhandary, A. D., Ootacamund to be in additional charge of Coonoor sub-circle; Mr. N. Srinivasa Rao, A. D., Tirupur to be A. D., Pollachi; Mr. B. G. Narayana Menon, A. D., Pollachi to be A. D. in the Co. 2 Scheme.

**Leave.** Mr. A. Abdul Samad, Dry Farming Station, Bellary, l. a. p. for 30 days from 4-12-'36 with permission to prefix the Xmas and New Year holidays; Mr. R. Kolandavelu Naicker, A. D., Peruvani, extension of l. a. p. for 2 months on m. c.; Mr. A. Gopalan Nair, F. M., Taliparamba extension of l. a. p. for 3½ months on m. c. from 23-12-'36; Mr. P. Kesavanunni Nambiar, A. D., Co. 2. Scheme, l. a. p. for 2 months from 23-12-'36.